

Descriptions of Two New Species of Encyrtidae From Mexico Reared from Mealy-Bugs (Hym., Chalcidoidea).

BY P. H. TIMBERLAKE.

(Presented by title by Mr. Fullaway at meeting of December 7, 1922.)

The following species of Encyrtidae were discovered by Mr. H. T. Osborn in the State of Vera Cruz, Mexico, in the course of his explorations for natural enemies of mealy-bugs to introduce into the Hawaiian Islands. Of these *Pseudaphycus utilis* has become established at Honolulu, but *Coelaspidia osborni* has not been recovered as yet, although liberated in large numbers. The types are in the collection of the Hawaiian Sugar Planters' Experiment Station, and paratypes will be distributed to various museums.

Pseudaphycus utilis n. sp. Figs. 1-4.

This species has a different habitus from all other species of *Pseudaphycus* known to me, but I think that it is properly placed in this genus. It is easily distinguished from all the described species of the genus and of the closely allied genera *Acerophagus* and *Bothriocraera* by its comparatively large size, entirely hyaline wings, and the bright yellow coloration with blackish pubescence on the mesonotum. In my table of the species of *Pseudaphycus* (Proc. U. S. Nat. Mus., Vol. 50, p. 570, 1916) it runs to *graminicola*, but differs in having the face and cheeks of normal length, the coloration bright yellow, the pubescence of the mesonotum dark instead of whitish, the abdomen much shorter or hardly longer than wide, the ovipositor more briefly protruded, the wings considerably wider, etc. The species is a parasite of *Pseudococcus nipae* (Maskell) and has become established at Honolulu from material collected at Orizaba, Mexico, by Mr. Osborn in the spring of 1922.

Female. General form robust, the thorax being almost as thick dorso-ventrally as wide; head rather thick fronto-occipitally, the outline in dorsal view broadly elliptical with the occipital margin slightly and broadly emarginate at the middle, the surface strongly convex from side to side; as seen from the side the outline is triangular with the facial side about a fourth longer than the dorsal side, the angulation well rounded off; as seen from

in front it is slightly wider than long, the dorsal part strongly rounded in outline, the cheeks strongly converging below toward the mouth; occiput only slightly concave, its dorsal margin acute; eyes large, broadly oval, a little broader below and not quite reaching to the occipital margin, the width of each somewhat more than a third of the total width of head; frontovertex slightly more than twice as long as wide, its sides parallel; ocelli either in an equilateral triangle or with distance between the posterior pair slightly less than the other two sides of the triangle, the anterior ocellus placed slightly behind the center of the frontovertex, the posterior pair about one-fourth their own diameter from the eyes and about twice their diameter from the occipital margin; cheeks somewhat shorter than the greatest width of eyes; the face a little longer than the cheeks, the scrobal impression moderately deep and nearly semi-circular, the scrobes proper in the form of converging lines not meeting above.

Antennae inserted far apart close to the clypeal margin; scape slender, slightly flattened but not expanded, reaching well beyond the scrobal impression of face; pedicel long and slender or about equal to the first three funicle joints and one-half of the fourth joint combined, or a little more than one-third as long as the scape proper; funicle joints gradually increasing in size distad, all somewhat wider than long, the fifth not quite twice as wide as the first; club large, oval, a little longer than the funicle, well rounded and slightly obliquely truncate at apex.

Mandibles with the two outer or ventral teeth distinct, the middle one longer and more acute, but the inner or dorsal tooth nearly rectangular. Maxillary palpi four-jointed, the joints not greatly unequal in length, the first one shortest, the apical one longest, and the third one stoutest; labial palpi indistinctly three-jointed with the middle joint very short and perhaps not always differentiated.

Thorax moderately convex above, the collar of pronotum of about the normal structure found in *Aphycus* and allies; mesoscutum twice as wide as long, without traces of parapsidal lines; axillae rather large, twice as wide as long, and meeting rather broadly at their inner tips; scutellum somewhat longer than its basal width, acute at apex, the disk strongly depressed, the lateral margins abruptly declivous and well elevated; propodeum very short medially, but longer at the sides, depressed anteriorly, but strongly declivous on posterior half, especially at the sides.

Wings reaching well beyond apex of the abdomen and moderately wide; submarginal vein with about twelve well developed setae; the marginal vein punctiform, the postmarginal somewhat longer than the marginal, but indistinct and with one moderately large seta; stigmal vein moderately long, enlarged at apex, but not slender at base as in *P. angelicus* (Howard); disk of wing uniformly pubescent, even in the basal area, the setae being considerably coarser and not so dense as in *angelicus*, the costal cell with four rows of fine setae in its basal half and with one to three rows in different parts of the apical half, the setae near apex of the cell becoming much larger; speculum very narrow next to the stigmal vein, but widening

below, where it is separated by one row of setae from the hairless streak along the posterior margin, but connecting therewith by means of an arm directed toward the base of the wing. Legs rather long, especially the middle pair; middle tibiae strongly enlarged at apex; the middle tarsi stout at base and tapering toward apex, the first joint nearly as long as the four following joints combined; tibial spur stout and as long as the first joint of the tarsus.

Abdomen hardly longer than wide and much shorter than the thorax, its apex broadly rounded, the dorsum depressed and slightly concave; ovipositor briefly protruded, the exerted part about one-fifth as long as the abdomen, or about equal to the basal joint of the hind tarsi.

Sculpture throughout extremely fine and alutaceous; under high magnification the surface of the head and notum appears finely reticulate, the reticulations of the frontovertex being rather finer than the facets of the compound eyes, those of the mesonotum considerably finer still and more transverse; frontovertex also with a few larger but very shallow pin-punctures not ordinarily perceptible, the mesonotum slightly shiny and with minute setiferous punctures; basal tergites of abdomen also with extremely fine reticulations.

Head without conspicuous pubescence, the eyes practically bare, the frontovertex with fine short hairs which are not easily seen and arranged mostly along the orbits, the occipital margin of the vertex, however, with a row of about six coarser black setae; notum of the thorax, including scutellum, with rather numerous, seriatly arranged, blackish setae; tegulae with an oblique row of similar setae.

General color nearly uniformly yellow, but of different shades due to post-mortem changes, varying from light cadmium to cadmium yellow or nearly orange (Ridgway), the coloration in life being bright yellow; the lower part of the face, the cheeks, underparts of thorax, and the legs somewhat paler yellow; antennae concolorous with the upper part of face, the funicle joints often considerably darker or even slightly dusky, the club contrastingly very pale yellowish or nearly white; tibiae and tarsi slightly more brownish than the base of the legs, the tip of the last joint of the tarsi dusky; a spot on the pronotum just above the neck, the narrow obliquely placed metanotal sclerite on each side of the scutellum and the center of the abdomen above more or less extensively behind the first tergite are often more or less infuscated, varying from brownish to blackish, but any or all of these marks may be faint or absent; a narrow, transverse blackish band on propodeum just tangent to the apex of the scutellum seems always to be present, but is often interrupted at the middle; the vibrissal or cereal plates of abdomen also black, and a minute dot beside each of the ocelli usually present, due apparently to pigment transfusing from the ocelli after death, as the position of dots in respect to the ocelli varies greatly; ovipositor yellow, but usually a little darker than the abdomen, the extreme apex often dusky to blackish; mandibles

brown at apex; wings entirely hyaline, the veins very pale or nearly colorless.

Length of body, (0.907 to) 1.48; length of head, 0.514; width of head, 0.554; thickness of head fronto-occipitally, 0.309; width of vertex at posterior ocelli, 0.191; length of antenna, 0.804; width of mesoscutum, 0.577; length of fore-wing, 1.37; width of fore-wing, 0.582; length of protruded part of ovipositor, 0.129 mm.

Male. Very similar to the female in structure and coloration; eyes somewhat smaller, the ocelli larger, the frontovertex proportionately a little broader; scrobes proper of the face considerably wider, curved, and practically meeting above; antennae of the same general structure, but the scape is a little wider and with a distinct broad emargination on dorsal margin just beyond the middle, the club solid, much slenderer, and much more obliquely truncate from below upward; abdomen smaller or not over one-half as long as the thorax, the venter with a median fold. General color paler yellow than in the female, or about empire yellow (Ridgway), the dorsum of the thorax, however, more or less cadmium yellow, the underparts of thorax, coxae, and femora nearly Martins yellow (Ridgway); black markings on the metanotum, propodeum, and abdomen much more prominent than is usual in the female, the abdominal mark being triangular in shape and pale in the center.

Length of body, (1.08 to) 1.44; length of head, 0.455; width of head, 0.474; thickness of head fronto-occipitally, 0.266; width of vertex at posterior ocelli, 0.172; length of antenna, 0.683; width of mesoscutum, 0.530; length of fore-wing, 1.21; width of fore-wing, 0.533 mm.

Described from the following material reared from *Pseudococcus nipae* (Maskell) from the State of Vera Cruz, Mexico (H. T. Osborn): 68 females, 11 males (holotype, allotype male, paratypes), Orizaba, April and May, 1922; 8 females, 1 male (paratypes), Rio Blanco, collected in April and issuing up to May 8, 1922; 1 female (paratype), Nogales, April 7, 1922; 4 females (paratypes), El Potrero, July and August, 1922.

Type No. 1099, Hawaiian Sugar Planters' Experiment Station.

Coelaspidia new genus.

Similar in some respects to both *Chrysoplatycerus* Ashmead and *Zarhopalus* Ashmead, but differing in many details. The female differs from either of these genera in being apterous, the thorax increasing in width behind the tegulae, the pronotum very large, the mesoscutum relatively small, the scutellum longitudinally grooved on the disk, the abdomen very large with the dorsum very strongly convex at least in life. From *Zarhopalus* the female differs further in having a broad dorsal

margin or fold to the scape, the flagellum much more massive, with reduction in size of the pedicel and enlargement of the club, the scutellum with an apical fascicle of hairs, etc. From *Chrysoplatycerus* it differs further in having the flagellum massively clavate, with a solid club, instead of being laminately expanded, the mandibles obscurely tridentate, the apical fascicle of hairs on the scutellum much smaller, consisting of one transverse row of setae, etc.

The males of *Chrysoplatycerus*, *Zarhopalus*, and *Coclaspidia* are very much alike, and in the absence of females might easily be considered to belong together in one genus. The habitus of all is exactly alike, and, as the best distinguishing characters are rather recondite, I offer the following table as an aid to their recognition:

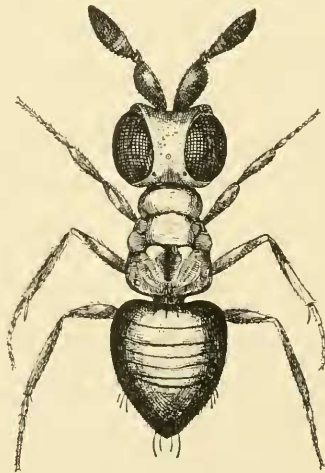
1. Mandibles narrow at apex, with an acute median tooth and an angulation on each side, producing an obscurely tridentate condition; flagellum circular in cross-section, sensoria present, but not producing a rugose effect, the first funicle joint and pedicel, not greatly unequal; marginal vein no longer than thick..... 2
- Mandibles narrow at apex and plainly bidentate, with the inner tooth much longer than the other; flagellum oval in cross-section, densely covered with short linear sensoria, producing a marked rugose effect, the pedicel much smaller than the first funicle joint; wings very broad, strongly triangular in shape, the marginal vein about two or three times as long as thick. .*Chrysoplatycerus* Ashmead
2. Scape, excluding radiicle, a little longer than the pedicel and first two funicle joints combined, and only slightly widened beneath; wings rather broad and triangular in shape, the submarginal vein not thickened apically*Zarhopalus* Ashmead
- Scape, excluding radiicle, no longer than the pedicel and first two funicle joints combined; distinctly, although not greatly, expanded beneath and concave on the outer surface; wings of about normal breadth and not at all triangular in shape, the submarginal vein slightly, but distinctly, thickened in the distal third of its course.

Coclaspidia new genus

Female. As compared with *Chrysoplatycerus* the head is thicker fronto-occipitally, the eyes much smaller so that the frontovertex becomes considerably wider, or about a third of the total width of the head; occiput deeply concave above, the occipital margin acutely, but not very sharply, angled; scrobal impression very deep and semi-circular, as in *Chrysoplatycerus*. Antennae similar as to the scape, but the flagellum is not laminate, it being much shorter, compressed and massively clavate, the cross-section of any part being oval, the joints all closely packed together; pedicel sub-

triquetrous and fully one-half as long as the funicle; the latter six-jointed, each joint much broader than long, the first much the smallest, it being considerably narrower than the apex of the pedicel, the following joints becoming successively much broader, but hardly increasing in length; club solid, somewhat greater in length and bulk than the funicle, but only slightly wider than the preceding joint, suboval in shape, the apex obliquely and roundly subtruncate beneath. Mandibles very slender, obscurely tridentate at apex, there being a prominent, very acute median tooth flanked on both sides by a much smaller tooth, the inner or dorsal one forming nearly a right angle with the inner margin of the mandible. Palpi short, maxillary pair four-jointed, apical joint about as long as the basal three combined, acute and with long hairs at apex, the second longest of the other three joints; labial pair three-jointed, the basal joint longest and over twice as long as the second, which is shortest; apical joint blunt at apex, with shorter hairs than on maxillary palpi.

Thorax moderately robust and convex above, increasing in width behind the tegulae; pronotum large, anteriorly conical, the collar as long as the mesoscutum, its posterior margin only slightly arcuate; mesoscutum short and transverse, about twice as wide as long, its anterior corners foveate; axillae well developed, not greatly wider than long, their inner tips acute and meeting medially or nearly so, their outer sides abruptly declivous; scutellum as long as the mesoscutum, five-sided, the apex being rather broadly truncate, the sides abruptly declivous and forming a sharp margin with the disk, the latter distinctly, although not deeply, concave except at apex, and sloping backward; propodeum large, sloping obliquely backward, hardly longer at the sides than at the middle, the spiracles small and almost circular.



Coelaspidia osborni.

Wings rudimentary, reaching only to the anterior margin of the propodeum. Legs of the normal length and structure, the middle tarsi tapering toward the apex, the first joint nearly as long as the following joints combined; spur of middle tibiae a little shorter than the first joint of the tarsus; hind tibiae with two short unequal apical spurs; hind tarsi slender, the first joint about equal to the last three joints combined.

Abdomen unusually large, or fully as long as the head and thorax combined, and much wider, convex above and beneath, with the apical part of the dorsum behind the vibrissal plates often, but not always, shrunken in after death; first tergite about twice as long as the second, which, with the following, except the last, decrease successively in length, the apical one being nearly as long as the three preceding combined; vibrissal plates or cerci situated at one-fourth the length of the abdomen from the apex; ovipositor entirely enclosed and concealed by the ventrites and without protruding sheaths.

Frontovertex very finely lineolate; pronotum and mesonotum and first tergite of abdomen finely reticulate; other parts of the body mostly smooth. Vestiture throughout very fine and sparse, being most abundant and conspicuous on the collar of the pronotum and on the mesoscutum; apex of the scutellum with a small, short fascicle of hairs consisting of about twelve fine black setae arranged in a transverse row close together, the outer pair of setae very short, the middle setae longest.

Male. With fully developed wings and very similar to the male of *Chrysoplatyceer*. Head considerably thicker fronto-occipitally, the occiput very deeply concave; as seen from above, well rounded on the sides, transverse anteriorly between the eyes and deeply emarginate at the occipital margin; in side view the dorsal and facial sides of the triangular outline are about equal. Antennae agreeing closely, the scape short, very slender in dorsal view, but compressed and somewhat expanded below, concave on the outer surface, pedicel about as long as thick at apex, and not much smaller than the first funicle joint; flagellum stoutly cylindrical, the funicle not tapering distad, each joint about as long as thick and nearly circular in cross-section, club solid and as long as the two and one-half preceding joints combined; entire funicle densely clothed with extremely fine short hairs, the club more sparsely pubescent; sensoria of the flagellum inconspicuous and not producing a rugose effect as in *Chrysoplatyceer*. Mouth parts as in the female.

Notum of the thorax very convex from side to side; the collar of pronotum very narrow and strongly arcuate; axillae very acute and meeting at their inner tips under the overlapping margin of the mesoscutum; scutellum rounded at apex. Fore-wings moderately wide, not triangular in shape, as in *Chrysoplatyceer*; marginal cilia short, the discal pubescence moderately dense and covering entire membrane, excepting the rather wide speculum; venation as in *Chrysoplatyceer*, except that the marginal vein is no longer than thick, the submarginal slightly thickened in the distal third of its course, and not thickened toward the base. Abdomen and legs

showing no distinctive differences from *Chrysoplatycerus*. Sculpture, vestiture, and type of coloration of the same character, excepting that the eyes are densely pubescent.

Genotype: *Coelaspidia osborni* n. sp.

Coelaspidia osborni n. sp. Figs. 5-9 and text figure.

Female. Head, as seen from above, strongly rounded on the sides, deeply concave at occipital margins, truncate and slightly concave in front; in side view, increasing in thickness fronto-occipitally from above downward to a point opposite the lower ends of the eyes; in frontal view, slightly wider than long, the outline well rounded on the sides and below and considerably flattened dorsally; eyes of medium size, broadly oval, and a little wider on the anterior half, well separated above from the occipital margin; frontovertex a little over twice as long as wide and increasing slightly in width anteriorly; the frontal ledge between the eyes and the serobal impression not transversely grooved, as in *Chrysoplatycerus splendens* (Howard); ocelli minute and arranged in slightly less than a right-angled triangle, the posterior pair placed a little more than their own diameter from the margin of the eyes and remote from the occipital border; serobal impression broadly transversely oval, the prominence between the antennae nearly as broad as long.

Antennae inserted far apart, rather close to the clypeal margin; scape projecting for about two-thirds of its length beyond the serobal impression; excluding the radicle, it is somewhat less than twice as long as wide, obliquely truncate at base on the dorsal side and broadly rounded at apex; its dorsal margin folded in an acute angle with the inner surface, thus forming a flat dorsal surface which increases in width toward the apex and forming a groove beneath on the outer side for the reception of the following joints; pedicel as long as thick and not cupped at apex; joints of flagellum closely joined into an elongate oval mass: the funicle somewhat smaller than the club, its first joint about one-third as wide as the sixth, with the intervening joints becoming gradually wider; club slightly wider than the funicle and somewhat acute at apex.

Frontovertex microscopically and transversely lineolate, the lines showing only a slight tendency to form reticulations, and with very minute, shallow, sparsely scattered pin-punctures; serobal impression highly polished, the facial prominence between the antennae rather rugulose and very finely shagreened; pronotum, mesoscutum, axillae, and scutellum finely reticulate, the pronotum being subrugulose and the scutellum smooth and becoming considerably polished toward the apex; pleura, propodeum, and abdomen smooth and polished, the first tergite nevertheless being finely reticulate.

Eyes bare; frontovertex with very short, fine setae, which are well scattered, quite inconspicuous, and inclined forward; facial prominence with fine whitish setae; pronotum with rather numerous fine reclinate setae, which are whitish in color; mesoscutum, axillae, and scutellum with similar,

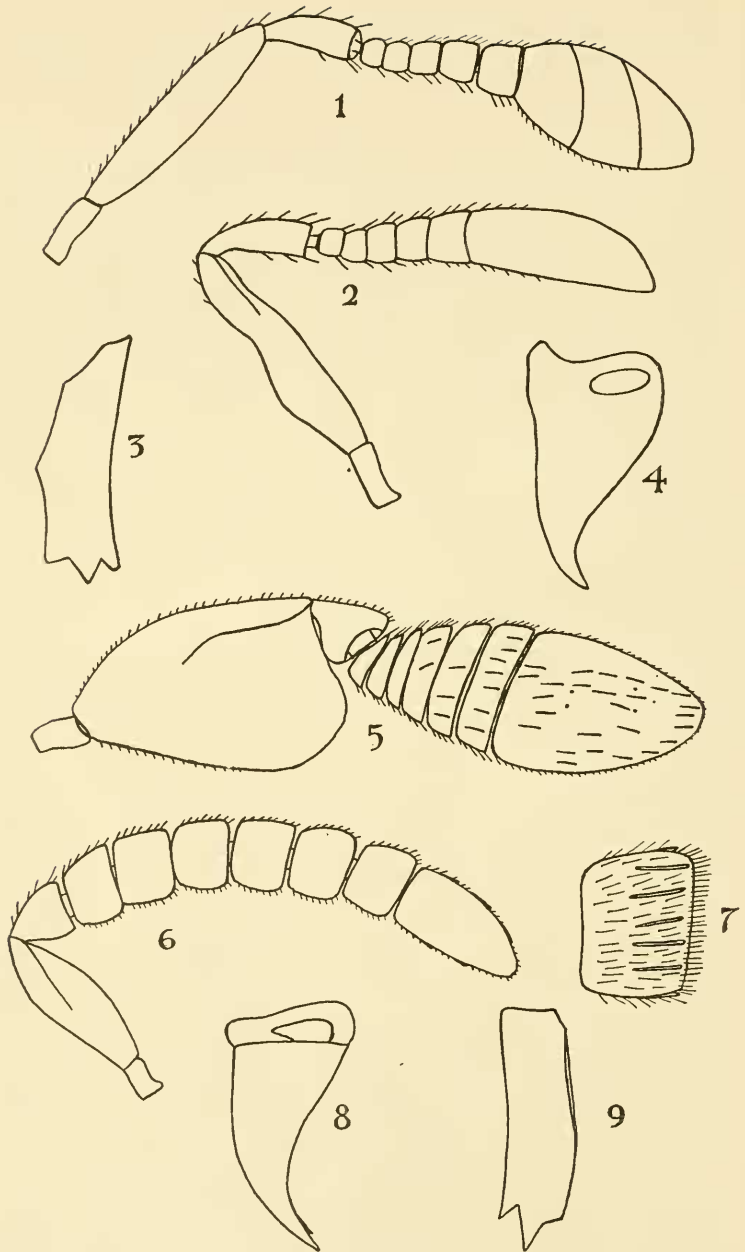
but sparser, pubescence, which becomes progressively sparser and less conspicuous posteriorly; abdomen nearly bare, although the tergites bear some very sparse, short setae, and the venter a few much longer hairs, especially at apex.

General color dark metallic green with a bronzy luster; the mesopleura, tegulae, the fovea at each corner of the scutum, the posterior margin of the basal tergite, and a connecting median longitudinal band on the same segment, which tapers forward, dark purple; a median longitudinal purplish band also usually present on the mesoscutum; rest of the first and the second tergite bright metallic green, the following tergites greenish with a purple luster, the venter darker or more or less blackish; facial prominence, lower part of the cheeks, sides of the notum between the scutellum and base of the wings and propodeum more or less brownish with a green luster, or occasionally in a few of the paratypes the whole head and notum are more or less brownish with a metallic luster, thus producing a marked bronzy effect; antennae black, the scape and pedicel paler except on the ventral margin of the former (in slide mounts appearing distinctly brown), the dorsal expansion of both scape and pedicel with a bright green luster; mandibles brown; legs brownish yellow, all the coxae, the apex of middle tibiae, and the middle tarsi, except apical joint, paler yellow, all the femora on apical half and the tibiae on basal half infuscated and somewhat metallic greenish.

Length of body, (0.59 to) 1.64; length of head, 0.452; width of head, 0.490; thickness of head fronto-occipitally, 0.287; width of vertex at posterior ocelli, 0.169; length of antennae, 0.676; width of mesoscutum, 0.377; width of propodeum, 0.452; length of abdomen, 0.860; width of abdomen, 0.664 mm.

Male. Head hardly wider than long, the cheeks somewhat converging toward the broadly rounded oral margin; eyes of medium size, about a fourth longer than wide, broadly rounded anteriorly; frontovertex about as long as wide, and widening both in front and behind on account of the curvature of the eye-margins; ocelli large, arranged in a right-angled triangle, the anterior ocellus just behind the center of the frontovertex, the posterior pair almost touching the occipital margin and placed a little more than their own diameter from the eyes; cheeks as long as the width of the eyes; face concave, the antennal prominence not much elevated, somewhat longer than wide, and just above the antennal sockets changing into a very narrow rounded carina-like ridge, which ascends medially to the angulation between the face and frons; on each side of this ridge lie the shallow scrobes, which are parallel in the upper third of their course and diverge below toward the antennal sockets.

Frontovertex subrugulose, transversely reticulate and with numerous fine scattered pin-punctures; face much smoother, being finely scaly-reticulate, the scrobes smooth and polished; cheeks exterior to the genal suture longitudinally reticulate; mesonotum finely, transversely reticulate and with very fine punctures; the scutum subrugulose, but not so rough as the



Mexican Eneyrtidae.

frontovertex; the axillae and scutellum smoother, the latter being considerably polished at apex; propleura, prepectal plates, and metapleura very finely scaly-reticulate, but nevertheless smoothish and shining; the reticulations on the metapleura much less apparent; mesopleura smooth and polished; abdomen comparatively coarsely, transversely reticulate, especially on the basal tergite, with the reticulations formed by fine raised lines, each reticulation generally over twice as wide as long.

Lower part of face, the cheeks, frontovertex, eyes, and mesonotum rather densely covered with fine, short, dark-colored setae, which are reclinate on the notum, erect and somewhat shorter on the eyes, suberect on the frontovertex, and inclined forward on the face and cheeks; scutellum with a pair of fine and considerably longer setae on each side of apex; pubescence of abdomen rather sparse and longer than that of the thorax, but not in any way conspicuous or distinctive.

General color dark metallic green, the face brilliant green, with the upper part of the antennal prominence above the socket dark purple; mesopleura also somewhat purplish; abdomen nearly black with a purplish and greenish luster; antennae black; legs metallic blackish with trochanters, base of all the femora, knee joints, tip of hind tibiae, apical third of front and middle tibiae and all the tarsi except apical joint brownish yellow, this color of the middle tibiae and tarsi being somewhat paler, and the hind tarsi dusky above; mandibles brown; the palpi yellowish white; wings hyaline, with dusky yellowish veins.

Length of body, (0.655 to) 1.07; length of head, 0.384; width of head, 0.419; thickness of head fronto-occipitally, 0.252; width of vertex at anterior ocellus, 0.209; length of antenna, 0.659; width of mesoseutum, 0.421; length of fore-wing, 0.912; width of fore-wing, 0.426 mm.

Described from 153 females, 59 males (holotype, allotype male, and paratypes) reared from *Pseudococcus calccolariae* (Maskell) on sugar-cane collected at El Potrero, Vera Cruz, Mexico, in May, June, and July, 1922, by H. T. Osborn, and in part bred in Honolulu from the same host and also from *Pseudococcus sacchari* (Cockerell) and *Pseudococcus kraunhiae* (Kuwana).

Type No. 1100, Hawaiian Sugar Planters' Experiment Station.

EXPLANATION OF PLATE XI.

Figs. 1-4, *Pseudaphycus utilis*.

1, Female antenna.

2, Male antenna.

3, 4, Frontal and dorsal view of mandible of female.

Figs. 5-9, *Coelaspida osborni*.

5, Female antenna.

6, Male antenna.

7, Sixth funicle joint of male antenna greatly enlarged.

8, 9, Dorsal and frontal view of mandible of female.